

Optoelectronic Terahertz Sources Based on Photomixers

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Molecular line observation in the THz region using heterodyne receivers is a powerful way to investigate the chemistry and physics of the interstellar medium. However, THz heterodyne observation's potential is far from being fully realized due to source-technology limitations. The available solid-state, CW sources with enough power to serve as local oscillators (LOs) above ~1 THz are currently limited to ~10% in bandwidth and 1.6 THz in maximum frequency. Additionally, the lack of high spectral purity, frequency-agile sources hinders laboratory spectroscopy, and receiver/component characterization. We are developing traveling-wave photomixers and laser systems to overcome these impediments. Our goals include providing space-borne LO technology for (HEB) mixers to over 3 THz and portable, automated signal sources for characterization of THz receivers/components as well as laboratory spectroscopy. The state of research will be presented along with discussions of requirements for THz LOs and laboratory test sources, and the photomixer approach's unique advantages.